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RHYSODINI OF SULAWESI AND NEARBY ISLANDS (COLEOPTERA: CARABIDAE OR RHYSODIDAE)

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Abstract.—A key to the Rhysodini of Sulawesi and the nearby Banggai Archipelago is provided. Six new species are described and illustrated: *Omoglymmius* (*s. str.*) *ferrugatus,* from Banggai, and the remainder from Celebes: *Plesioglymmius* (s. str.) *moorei, Omoglymmius* (s. str.) *wallacei, O.* (s. str.) *brendelli, O.* (s. str.) *seriatus* and *O.* (*Indoglymmius*) *astraea.* Comparisons are made with the two species previously recorded from Sulawesi, and a key to all eight species is included.

Up to the present, only two specimens of Rhysodini have been known from the large and zoogeographically important island of Sulawesi (formerly Celebes), the holotypes of *Rhyzodiastes* (*Temoana*) *singularis* (Heller) and *Omoglymmius* (s. str.) *repetitus* Bell and Bell. Recently we have studied Rhysodini collected during Project Wallace, an intensive exploration of the fauna of Sulawesi, involving personnel of the British Museum of Natural History, the National Museum of New Zealand, and the Commonwealth Scientific and Industrial Research Organization of Australia. This material has revealed six additional species, giving a clearer though still fragmentary picture of the rhysodine fauna of the island.

At present, we have published four parts of a five part monograph of the Rhysodini of the world (Bell and Bell, 1978, 1979, 1982, 1985). Part I (1978) includes a discussion of the phylogeny of the group and a glossary of morphological terms. Part V, not yet completed, will include a discussion of the zoogeography of the group, as well as some minor revisions of the phylogeny.

A preliminary discussion of the zoogeography of the group has already been published (R. T. Bell, 1979). Subgenera represented in Sulawesi include *Omoglymmius* s. str., *Omoglymmius* (*Indoglymmius*), *Plesioglymmius* s. str., and *Rhyzodiastes* (*Temoana*). *Omoglymmius* s. str. includes more than 70 species, distributed from the Solomon Islands to Europe. Three of the four species have their closest relationships with species of the Moluccas and New Guinea, suggesting relatively recent spread from the east. The fourth, *O. brendelli,* is clearly related to species of the Greater Sunda Islands and the Philippines, suggesting invasion from the north or west. *Omoglymmius* (*Indoglymmius*) has only two species, one in southern India, the other in Sulawesi, an enigmatic distribution. *Plesioglymmius* s. str. has three species, one in Borneo and Sumatra, one in Mindanao, and the third in Sulawesi. The species from Mindanao is clearly closest to that from Sulawesi, suggesting recent spread from the north. *Rhyzodiastes* (*Temoana*) has 25 species, distributed from northern Australia, the Solomon and Caroline Islands to eastern India. The species from Sulawesi is closest in morphology to a species from New Guinea. It may have reached Sulawesi from the east. This conclusion is very tentative, since there are probably many species of this subgenus still awaiting discovery.

KEY TO RHYSODINI OF SULAWESI AND BANGGAI

1. Minor setae of antennae confined to tufts on ventral surface of segments 5–10; each elytron with only four striae, innermost stria distinct only in basal half of elytron (CLINIDIINA) ..... *Rhyzodiastes* (*Temoana*) *singularis* (Heller)
– Minor setae forming complete ring near apex of segments 5–10; each elytron with seven striae. (OMOGLYMMIINA) 2
2. Paramedian grooves of pronotum incomplete anteriorly, not attaining anterior margin ..... *Plesioglymmius* (s. str.) *moorei* n. sp.
– Paramedian grooves complete (*Omoglymmius*) 3
3. Eyes large, round; temporal lobe without translucent area along medial margin. (*Omoglymmius* s. str.) 4
– Eyes virtually absent, represented only by indistinct paler areas; temporal lobe with translucent area along medial margin ..... *Omoglymmius* (*Indoglymmius*) *astraea* n. sp.
4. Temporal seta absent; lateral margin of inner carina of pronotum gradually sloped to paramedian groove ..... *Omoglymmius* (s. str.) *seriatus* n. sp.
– Temporal seta present; lateral margin of inner carina sharply defined 5
5. Postorbital tubercle present; pronotal carinae nearly impunctate, with very few, very fine punctures ..... *Omoglymmius* (s. str.) *repetitus* Bell and Bell
– Postorbital tubercle absent; outer carina coarsely, densely punctate, inner one varied 6
6. Median lobe, antennal lobes densely microsculptured, dull; base of elytral Stria 4 formed into scarp; inner carina with 10–15 fine punctures ..... *Omoglymmius* (s. str.) *ferrugatus* n. sp.
– Median lobe, antennal lobes shining, not microsculptured; base of Stria 4 not formed into scarp; inner carina with 5 or fewer punctures 7
7. Frontal grooves dilated, median lobe narrow, broadly separated from temporal lobes; inner pronotal carina with 1–5 coarse punctures near middle ..... *Omoglymmius* (s. str.) *wallacei* n. sp.
– Frontal grooves narrow, median lobe broad, narrowly separated from temporal lobes; inner carina with 1 minute puncture ..... *Omoglymmius* (s. str.) *brendelli* n. sp.

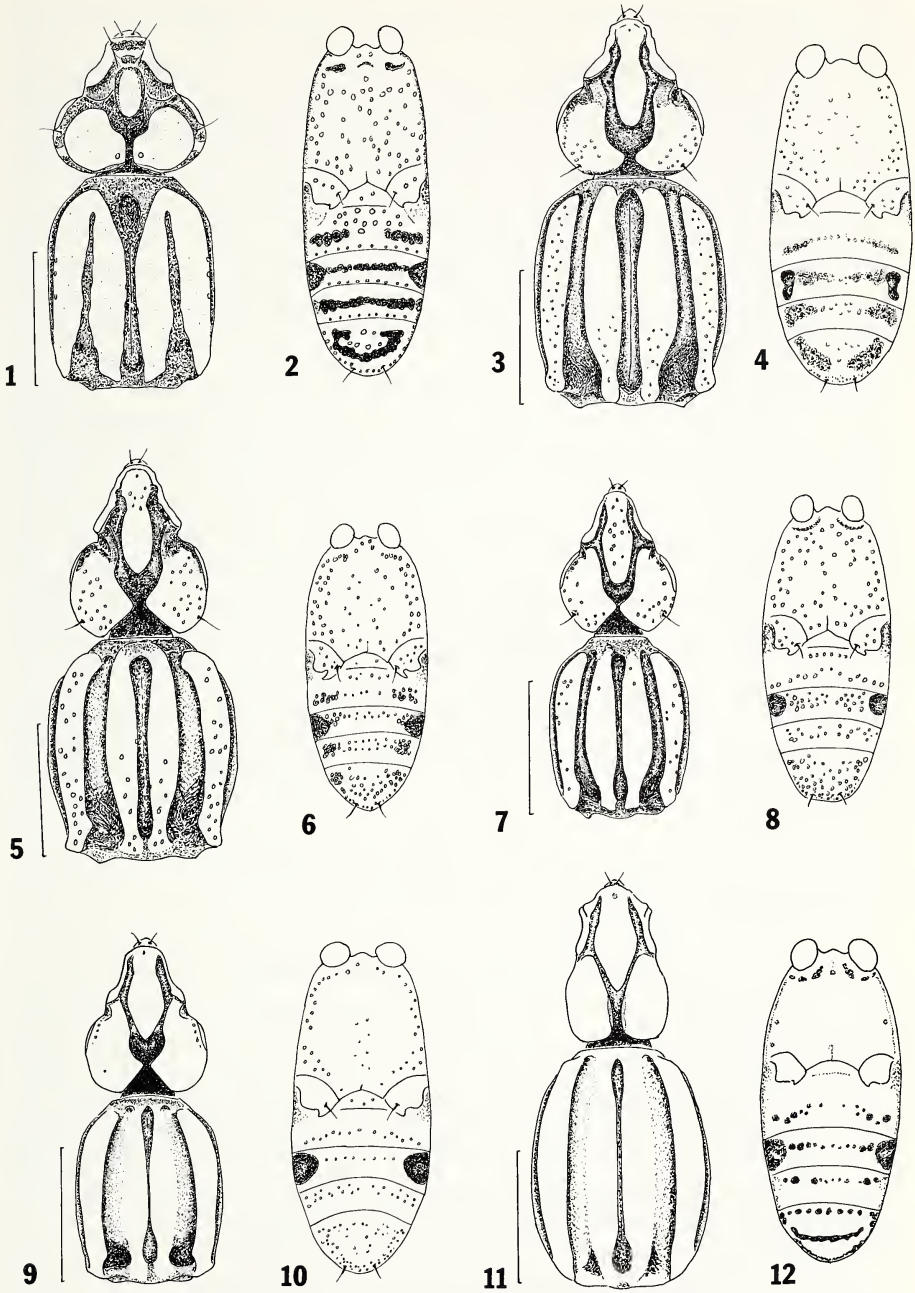
Rhyzodiastes (*Temoana*) *singularis* Heller, 1898

Clinidium singulare Heller, 1898:3.
Rhyzodiastes singularis: Bell and Bell, 1978:61.
Rhyzodiastes (*Temoana*) *singularis*: Bell and Bell, 1985:27.

Bell and Bell (1985) provide a detailed description and figure of this species, still known only by the holotype, a female. The most closely related species is *Rhyzodiastes* (*Temoana*) *guineensis* (Grouvelle) of New Guinea. The type locality "Lompa-Battau" is probably a variant spelling of Lampobatang, a mountain at 5°20′S, 119°55′E, near Bonthain in the Southern Peninsula of Sulawesi. The area is an isolated mountain range, connected to the remainder of Sulawesi only by very lowlands, and has probably been a separate island at times. Other species of this subgenus are likely to be found in Sulawesi.

Plesioglymmius (s. str.) moorei, new species

Type material. Holotype male (Figs. 1, 2), "Indonesia, Sulawesi Utara, Dumoga-Bone N.P. Project Wallace 1985, lowland forest, Toraut vi. B. P. Moore" (CSIRO). Paratypes 6 females, from same locality, but dated September 1985 (NMNZ). This series was collected by Dr. R. Hornabrook, a fact not indicated on the label.



Figs. 1–12. Dorsal view of head and pronotum, ventral view of female metasternum and abdomen. 1, 2. *Plesioglymmius* (s. str.) *moorei.* 3, 4. *Omoglymmius* (s. str.) *ferrugatus.* 5, 6. *Omoglymmius* (s. str.) *wallacei.* 7, 8. *Omoglymmius* (s. str.) *brendelli.* 9, 10. *Omoglymmius* (s. str.) *seriatus.* 11, 12. *Omoglymmius* (*Indoglymmius*) *astraea.*

Description. Length 5.1–7.3 mm; head clearly broader than long; antennal stylet short, conical; clypeus as described for *P. silus* Bell and Bell of Mindanao; temporal lobe with 1–2 punctures near medial margin; 1 temporal seta, near posterior end of temporal groove, latter broadly pollinose; postorbit thickly pilose, without visible punctures; 1 postorbital seta opposite middle of eye (unilaterally absent in 2 specimens); mentum of male entirely pollinose except for anterior margin; mentum of female with central area glabrous, remainder pilose; 1 pair of postlabial setae.

Pronotum relatively short, length/width about 1.36; lateral margins parallel, not narrower posteriorly, as in *P. silus* Bell and Bell of Mindanao; pronotal grooves as in *P. silus*; outer carina with few coarse punctures near lateral margins, and many very fine, scattered punctures; notopleuron glabrous, margined with pilosity; prosternum pilose; prosternal process coarsely punctate, not pilose except for line of punctures and pollinosity on midline.

Elytral striae coarsely punctured, punctures not connected by pollinosity; metasternum in both sexes coarsely punctured, glabrous; male with pilose area at middle of Sternum 2+3, connected posteriorly to transverse band of pollinosity extending across sternum near posterior margin; female with Sternum 2+3 without anterior pollinose area, with transverse band widely interrupted at midline; Sternum 4, 5 in both sexes each with transverse pollinose band and with row of punctures close to posterior margin; Sternum 6 with some coarse punctures in middle anteriorly, and with pollinose band paralleling curved posterior edge, connecting to transverse band paralleling anterior margin, latter interrupted in middle; both sexes with lateral pit on Sternum 4, female with shallower additional pits on Sternum 5; male with ventral tooth on anterior femur; middle, hind calcars both small, acute.

Discussion. This species is easily distinguished by the presence of one temporal seta. *P. elegans* Grouvelle of Borneo and Sumatra lacks a temporal seta, while *P. silus* Bell and Bell of Mindanao, has 4 or 5. The type locality is on the Northern Peninsula of Sulawesi.

Omoglymmius (s. str.) *repetitus* Bell and Bell

Omoglymmius (*s. str.*) *repetitus* Bell and Bell, 1982:222.

For a complete description and illustrations, see the original description. This is the only species from Sulawesi which has a postorbital tubercle. The near absence of punctures on the pronotal carinae separates it from all species except *O. seriatus.* The closest relatives are *O. quadraticollis* (Arrow) of the Tanimbar Islands, and several species from New Guinea.

Two additional specimens were collected during Project Wallace, both females, labelled respectively "Sulawesi Utara, Dumoga-Bone N.P., 21 October, 1985, nr. base of Gunung Poniki, under bark of dead tree, Project Wallace, BM 1985-10," and "Sulawesi Utara, Dumoga-Bone N.P., 10 March 1985, on or under bark, Project Wallace 1985-10." (BMNH). The lengths of the three known specimens range from 6.0–7.4 mm. The known localities are on the Northern Peninsula.

Omoglymmius (s. str.) ferrugatus, new species

Type material. Holotype male (Figs. 3, 4), "Banggai Arch., Potil Kecil, 1°28′S, 123°34′E, 12–19, ii, 1980, M. J. D. Brendell, B. M. 1980-280, under bark of fallen tree" (BMNH).

Description. Length 7.0 mm. First segment of antenna scarcely swollen at base of principal tactile seta; antennal segments 1–10 punctate, punctures of distal segments more finely so; Segment 11 impunctate; head longer than wide; median lobe lance-shaped, its apex obtuse; frontal space broad, U-shaped; medial angle obtusely rounded, separated; posteriomedial margin slightly curved; occipital angle completely rounded; antennal lobe microsculptured, raised above level of temporal lobe; anterior end of temporal lobe extensively pollinose; pollinosity of orbital groove extended posterior to eye; temporal lobe with about 20 rather fine punctures; one temporal seta; postorbital, suborbital tubercles absent; eye large, round.

Pronotum short, subquadrate; length/greatest width 1.17; widest at middle, lateral margins only slightly curved; lateral margin scarcely emarginate anterior to hind angle; inner carina wider than outer one at middle of length; inner carina constricted just anterior to base; latter truncate; outer carina with about 30 very fine punctures; inner carina with 11–14 very fine punctures; pronotum without setae; prosternum without precoxal carina.

Elytra narrow, elongate; striae impressed, coarsely punctate; Interval 5 slightly more elevated than others; base of Stria 4 forming longitudinal scarp; pollinose area on base opposite Interval 3; Stria 4 with 1 seta at apex; apical striole with 1 seta; Stria 7 with about 7 setae near apex; metasternum densely but shallowly punctate; abdominal sterna finely punctate, punctures shallow, finely pollinose except near margins of Sterna 5, 6, where punctures coalesce into extensive pollinose areas; male with deep triangular lateral pit on Sternum 4 (female unknown); male with prominent ventral tooth on anterior femur; middle calcar minute, triangular; hind calcar triangular, its apex obtuse, its proximal margin sinuate.

Discussion. This species is obviously closely related to *O. wittmeri* Bell and Bell, 1982 and *O. continuus* Bell and Bell, 1982, both from the Sula Islands, which are about 100 km east of the Banggai Archipelago. In the key in Bell and Bell (1982) it will trace to Couplet 9, along with the two species from Sula. It will not go into either alternative, differing from *O. wittmeri* in the more quadrate shape of the pronotum, and the rounder medial angle, and from *O. continuus* in the uninflated first antennal segment, the presence of only 1 temporal seta, and the sharp medial edge to the antennal lobe. It differs from both species in the shape of the hind calcar.

Omoglymmius (s. str.) wallacei, new species

Type material. Holotype male (Figs. 5, 6), labelled "Indonesia: Sulawesi Utara, Gng. Ambang F. R., nr. Kotamobagu, 25 January 1985, lower montane forest, 1200–1400 m, fallen tree, Project Wallace B.M. 1985-10." Six paratypes. One female same as holotype; others same locality as holotype but one female, 18 February 1985; one female, September–October 1985, malaise trap: three males, 17 February 1985 (all BMNH).

Description. Length 6.7–8.3 mm; antennal segments 1–3 coarsely punctate, remaining segments more finely so; head about 1.5 times longer than wide; preocular portion produced; median lobe narrow, sides almost parallel, tip obtuse; anterior half of median lobe with 1–6 coarse punctures or impunctate; frontal space relatively small, U-shaped; medial angles obtuse, separated; temporal lobe evenly rounded posteriorly; anterior part of temporal lobe depressed, pollinose; orbital groove obsolete; posterolateral half of temporal lobe punctate; one temporal seta; postorbital, suborbital tubercles absent; eye large.

Pronotum relatively short; length/greatest width 1.12, widest slightly anterior to middle, sides curved, both base and apex narrowed; lateral margin sinuate anterior to hind angle; carinae subequal at middle; medial margin of lateral carina distinctly sinuate near base; outer carina widest at anterior 0.3; inner carina widest posterior to middle; outer carina coarsely, densely punctate; inner one with 4–8 coarse punctures; pronotum with setae or precoxal carinae; anterior part of prosternum, propleuron heavily microsculptured; prosternal process coarsely punctate; pronotal epipleuron coarsely punctate.

Elytra relatively short; striae coarsely punctate; base of Stria 4 with or without pollinose spot but without scarp, Stria 4, apical striole apparently without setae; Stria 7 with about 3 setae near apex; metasternum coarsely punctate along all margins, central disc finely punctate or nearly impunctate; abdominal sterna rather coarsely punctate, punctures of Sterna 3, 4 forming rather narrow band, but not uniseriate; lateral punctures of Sterna 3–5 enlarged, partly coalescent; punctures of Sternum 5 in broader band; those of Sternum 6 scattered; both sexes with deep, semicircular lateral pit on Sterum 4; male with ventral tooth on anterior femur; middle calcar small, acute; hind calcar with base occupying 0.25 of length of tibia, apex of calcar separated from tip of tibia by distance about equal to tibial spur, apex rounded, margin sinuate proximad to it.

Discussion. This species seems closest to *O. nasalis* Bell and Bell, of Buru, in the Moluccas, which it resembles in the depression of the anterior part of the temporal lobe, the microsculpture of the prosternum and propleuron, and the shape and punctuation of the pronotum. The less elongate snout might give trouble in our "Key to Species from Wallacea," as it will not give a clear alternative in Couplet 3. From *O. nasalis,* the first choice, it differs in the shorter snout, and the coarsely punctate pronotal epipleuron.

If it is taken to 3′, it traces to *O. wittmeri* Bell and Bell. It differs from the latter species in the longer head, coarser pronotal punctures, punctate median lobe and pronotal epipleuron and lack of a scarp at the base of Stria 4.

It is appropriate to name this species for Alfred Russel Wallace, the pioneer natural selectionist and entomological explorer of this region. The name also commemorates Project Wallace, which gathered the specimens used in this study.

Omoglymmius (s. str.) brendelli, new species

Type material. Holotype female (Figs. 7, 8), "Sulawesi Tengah, nr. Morowali, Ranu Lakes, 7–10, iii, 1980. M. J. D. Brendell, B.M. 1980-280, in rotten log" (BMNH). The locality is at 1°52′S, 121°30′E, near the eastern shore of the central part of Sulawesi, near the Gulf of Tolo.

Description. Length 5.7 mm; antennal segments 1–2 coarsely punctate, segments 5–10 finely punctate; median lobe broad, oval, coarsely punctate; frontal grooves narrow; frontal space small, U-shaped, its lateral margins broadly curved; medial angles rectangular, contiguous; posteriolateral margin oblique; posterior angle rounded, orbital groove fine, not extended posterior to eye; temporal lobe with 10–18 punctures on posterior, lateral portions; 1 temporal seta; postorbital, suborbital tubercles absent; eye large, round.

Pronotum moderately elongate, widest anterior to middle, length/greatest width 1.18; base, apex narrowed, lateral margins curved; lateral margin scarcely sinuate anterior to hind angle; inner carina slightly broader than outer one at middle; outer

carina widest at anterior 0.33; inner carina widest at posterior 0.33; base of inner carina slightly broadened, truncate; outer carina with 12–16 rather coarse punctures, inner carina with 1 minute puncture in anterior 0.25; pronotum without setae; precoxal carina absent; prosternum coarsely punctate; propleuron, anterior margin of prosternum pollinose; epileuron of pronotum punctate.

Elytron relatively long, narrow; stria impressed, coarsely punctate, punctures near apex smaller; base of Stria 4 without scarp or pollinosity; Stria 4 with 2 setae near apex; apical striole with 1 seta; Stria 7 with about 5 setae near apex, metasternum punctate; abdominal sterna with coarse, scattered punctures; female with round lateral pits on Sternum 4 (male unknown).

Discussion. This species will not key in the "Key to the Species of Wallacea" (Bell and Bell, 1982). It would reach Couplet 10, where the curved pronotal margins would suggest *O. viduus,* of the Kei Islands, but the reduced punctures of the pronotum would exclude it. The new species seems more like numerous species from the Greater Sundas and the Philippines, particularly *O. nemoralis* Bell and Bell from Sarawak, although the latter has more elytral setae. Unlike other *Omoglymmius s. str.* of Sulawesi, its affinities appear to be with the west and north.

We name this species for the collector, M. J. D. Brendell, who first suggested the possibility of working on the Rhysodini of Project Wallace.

Omoglymmius (s. str.) seriatus, new species

Type material. Holotype female (Figs. 9, 10), "Sulawesi Tengah, Mt. Tambusisi 4,000 ft, 1°39′S–121°21′E, 3–13 IV, 1980. M. J. D. Brendell, B.M. 1980-280, under bark of fallen tree" (BMNH). The locality is near the north coast of the central part of Sulawesi, just south of the Gulf of Tomini.

Description. Length 6.0 mm; antennal segments 1–2 coarsely punctate, outer segments successively more finely, indistinctly punctate; except for 10–11, latter impunctate; head elongate, nearly 2 times longer than wide; preocular portion produced; lateral surface near antennal base sloped dorsomedially; median lobe broad, rhomboidal, impunctate; frontal space small, U-shaped; medial angles slightly obtuse, slightly separated; posteriomedial margin oblique; temporal seta absent; temporal lobe with a few minute punctures in line above eye; eye large, round; mentum elongate, not depressed posteriorly.

Pronotum moderately elongate, length/greatest width 1.27, subquadrate, sides only slightly curved; widest anterior to middle; base slightly narrowed, apex more distinctly so; lateral margin of inner carina gradually sloped into paramedian groove, as in *Rhyzodiastes* (*Temoana*); median groove very narrow, linear at middle; anterior and posterior median pits thus conspicuous; outer carina widest opposite anterior median pit, gradually narrowed posteriorly, its medial margin sinuate opposite basal impression; inner carina widest at middle, constricted between posterior median pit and basal impression, dilated, truncate at extreme base; carinae impunctate; pronotum without setae; prosternum with line of coarse punctures along anterior margin and anterior to coxae.

Elytra inconspicuously opalescent, moderately elongate; striae impressed, punctate; base without pollinosity; base of Stria 4 without scarp; Stria 4 with 1 seta near apex; Stria 7 with 4–5 setae near apex; metasternum with row of punctures along each margin, disc impunctate except for a few fine punctures in posterior part of median line; abdominal Sterna 3, 4 with punctures uniseriate; Sterna 5, 6 with punctures

scattered; Sternum 4 of female with deep, oval lateral pit; male unknown. Hind wings fully developed.

Discussion. The gradual slope of the lateral margin of the inner carina, the elongate snout, the narrow frontal grooves, and lack of pronotal punctures give this species much the appearance of a *Nitiglymmius.* The fully developed eyes and hind wings exclude it, as currently defined. It might, however, prove to be related to the latter subgenus when genitalia and other additional features have been studied. In the key to species from Wallacea (Bell and Bell, 1982), it would key to *O.* (s. str.) *nasalis* Bell and Bell, from which it is easily separated by the impunctate pronotum and narrow frontal grooves.

Omoglymmius (Indoglymmius) astraea, new species

Type material. Holotype male (Figs. 11, 12), "Gunung Muajat, 1,780 m, Sulawesi Utara, 6-10-85, R. W. Hornabrook" (NMNZ). The locality is on the Northern Peninsula. Paratypes, two females, one same data as male (NMNZ); the other from the same place, but dated 5-10-85 (NMNZ).

Description. Length 5.9–6.3 mm. Form elongate; antennae without basal setae or punctures; neither dorsal nor ventral surface at all opalescent; head elongate, margin sinuate anterior to eye; snout unusually broad; median lobe broad, rhomboid; frontal grooves narrow, linear; medial margin translucent along frontal space; frontal space very narrowly V-shaped; orbital groove absent; medial and temporal lobes impunctate; temporal setae absent; eye virtually absent, evident only under strong light as slightly less pigmented area, but not represented in external structure; postorbital tubercle absent; mentum impunctate; median tooth of mentum more prominent than in related species; base of mentum not pollinose, but with 2 pairs of deep pits.

Pronotum elongate, length/greatest width 1.38; sides evenly curved, not sinuate near hind angle; paramedian groove linear; median groove deep, linear; anterior, posterior pits large, deep; carinae entirely impunctate; marginal grooves narrow, deep, complete; prothorax without anterior "collar"; prosternum with a group of coarse punctures just anterior to coxae; epipleurae impunctate.

Elytra moderately elongate, less parallel-sided than in *O. semioculatus*; elytron with trace of longitudinal scarp at base of Stria 4; humeral tubercle lobate; elytra evenly convex in lateral view, not forming posterior "hump"; elytral striae shallowly impressed, coarsely punctate; elytra entirely without setae; metasternum impunctate except for 1–3 coarse punctures near lateral margins; abdominal Sterna 3, 4, 5 each with single transverse row of very coarse punctures; Sternum 6 with similar row near base, also curved transverse groove near apex; abdominal setae entirely absent; both sexes with ventral tooth on anterior femur, that of female small; male with calcars minute; female with small denticle posterior to tibial spur (simulating a second spur); female with distinct glabrous lateral pit in Sternum 4 and much smaller one on Sternum 5.

Discussion. This species has the most reduced eyes of any Rhysodine so far discovered. The elongate head, the very reduced eyes, and the shape of the pronotum suggest *O.* (*Nitiglymmius*) *semioculatus,* from Siargao, near Mindanao. The translucent area on the temporal lobe makes it trace to *O.* (*Indoglymmius*) *lineatus* (Grouvelle), but the latter species has well developed eyes and broad paramedian grooves. Whether the two are really related is doubtful, but a decision must await further studies.

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